

What is claimed is:

1                   1. In a real time operating system for  
2 supporting at least one application, a processor and at  
3 least one hardware resource, the improvement  
4 comprising, in combination:

5                   a) a power manager layer; and  
6                   b) said power manager layer being arranged to  
7 exchange information with said at least one  
8 application, said processor and said at least one  
9 hardware resource to provide real time power management  
10 responsive to said information.

1                   2. An operating system as defined in Claim 1  
2 wherein said at least one application includes at least  
3 one application-program interface call to said power  
4 manager layer.

1                   3. An operating system as defined in Claim 2  
2 wherein said at least one call includes:

3                   a) a notification that said at least one  
4 application has been initiated; and  
5                   b) a notification that said at least one  
6 application has ended.

1                   4. An operating system as defined in Claim 3  
2 wherein said application is characterized by:

3                   a) a utilization profile; and  
4                   b) said utilization profile is transmitted to  
5 said power manager with said start call.

1                   5. An operating system as defined in Claim 2  
2 wherein said at least one call includes:

3                   a) a notification that said at least one  
4 application requires at least one hardware resource;  
5 and

6                   b) a notification that said at least one  
7 application no longer requires said at least one  
8 hardware resource.

1                   6. An operating system as defined in Claim 1  
2 further comprising:

3                   a) a hardware abstraction layer;

4                   b) information is exchanged between said  
5 power manager layer and said hardware abstraction layer  
6 by means of application-interface calls; and

7                   c) said hardware abstraction layer is  
8 arranged to cause said processor to be actuated in  
9 accordance with said calls.

1                   7. An operating system as defined in Claim 1  
2 further comprising:

3                   a) a driver layer; and

4                   b) information is exchanged between said  
5 power manager layer and said driver layer by means of  
6 application-program interface calls.

1                   8. An operating system as defined in Claim 1  
2 wherein said power manager layer further comprises:

- 3                   a) a processor power state selection mode;  
4 and  
5                   b) a hardware resource power state selection  
6 mode.

1                   9. An operating system as defined in Claim 8  
2 wherein said power manager layer includes a resource  
3 allocation table.

1                   10. An operating system as defined in Claim  
2 1 wherein said driver layer is arranged to:

- 3                   a) receive an application-program interface  
4 call containing a power state instruction concerning a  
5 resource from said power manager layer and to generate  
6 a corresponding instruction; and  
7                   b) transmit corresponding information to said  
8 hardware abstraction layer by application-program  
9 interface call.

1                   11. An operating system as defined in Claim  
2 6 wherein said hardware abstraction layer is further  
3 arranged to:

- 4                   a) exchange information with a driver layer  
5 by means of program-interface calls; and  
6                   b) cause said at least one resource to be  
7 actuated in accordance with said calls.

1                   12. A real time power management system for  
2 a processor-driven hardware platform for supporting at  
3 least one application, said platform having at least  
4 one hardware resource wherein said processor is  
5 characterized by a plurality of power states and said  
6 at least one hardware resource is characterized by a  
7 plurality of power states, said power management system  
8 comprising, in combination:

9                   a) an operating system for controlling said  
10 processor and said at least one hardware resource;

11                   b) said operating system including a power  
12 manager layer arranged to select a processor power  
13 state and a power state of said at least one hardware  
14 resource in response to a real time input from said at  
15 least one application.

1                   13. An integrated power management system as  
2 defined in Claim 12 wherein:

3                   a) said real time input is provided by means  
4 of an application-program interface call from said at  
5 least one application to said power manager layer.

1                   14. An integrated power management system as  
2 defined in Claim 13 wherein said at least one call of  
3 said at least one application additionally includes:

4                   a) a notification that said at least one  
5 application has been initiated; and

6                   b) a notification that said at least one  
7 application has ended.

1                   15. An integrated power management system as  
2 defined in Claim 13 wherein said at least one call of  
3 said at least one application additionally includes:

4                   a) a notification that said at least one  
5 application requires at least one hardware resource;  
6 and

7                   b) a notification that said at least one  
8 application no longer requires said at least one  
9 hardware resource.

1                   16. A method for controlling power  
2 consumption in a hardware platform responsive to  
3 information from at least one application, said  
4 platform including a processor having a plurality of  
5 power states and at least one hardware resource  
6 characterized by a plurality of power states, said  
7 method comprising the steps of:

8                   organizing said operating system into a  
9 kernel, a driver layer, a hardware abstraction layer,  
10 and a power manager layer;

11                   applying at least one real time input from  
12 said at least one application to said power manager  
13 layer;

14                   determining a power management policy in said  
15 power manager layer in response to said at least one  
16 real time input;

17                   communicating said power management policy  
18 from said power manager layer to said processor and  
19 said at least one hardware resource.

1                   17. A method as defined in Claim 16 wherein  
2 the step of determining a power management policy  
3 additionally comprises the step of determining a  
4 processor power state.

1                   18. A method as defined in Claim 16 wherein  
2 the step of determining a power management policy  
3 additionally comprises the step of determining a power  
4 state of said at least one hardware resource.

1                   19. A method as defined in Claim 16 wherein  
2 the step of applying at least one real time input  
3 additionally includes the steps of:  
4                   embedding an application-processor interface  
5 call into said at least one application; and  
6                   communicating said real time input by means  
7 of said call.

1                   20. A method as defined in Claim 16 wherein  
2 the step of communicating said power management policy  
3 from said power manager layer to said processor and  
4 said at least one hardware resource additionally  
5 includes the steps of:  
6                   embedding application-program interfaces into  
7 said power manager layer, said driver layer and said  
8 hardware abstraction layer; and  
9                   communicating said power management policy by  
10 means of said calls.